AltEn Soils & Transformation Products

Big picture research questions:

What parent pesticides are in the soil samples? Targeted analytical analysis has already been done on select soil samples. Use this as a starting point.

What transformation products can we predict? Using CTS (Caroline Stevens?), Catalogic (Louis Groff), OECD QSAR Toolbox (Louis Groff), other prediction tools, and literature, predict transformation products from targeted analysis of pesticides. Possibly run extracts against my targeted suspect screening list depending on analytes targeted by Univ of Nebraska. Develop suspect screening list from all sources (Matt Boyce).

What transformation products can we identify? NTA approach and suspect screening lists from above.

How does the predicted transformation products compare to measured? Matt Boyce has great visuals for this comparison related to metabolism.

What effects (toxicity) can we predict from the samples- with the identified parent pesticides and transformation products? What prediction tools from the "Toolbox" are available for this? Quantitative NTA to get an idea of concentration in order to make these predictions?

What effects do we see? Run entire extract to determine toxicity? If toxicity observed, fractionate to determine which contaminants responsible for toxicity? Endpoints- lethality, or consider sub-lethal endpoints?

Email correspondence with Brett Blackwell- the assays they run are more for water column species so the link to soils would be less direct, but the spin could be runoff from contaminated soils to waterbodies. I think they mostly perform dose response curves to get points of departure estimates, which isn't exactly what we are looking for, but they can get mortality endpoints for two of the species- daphnia and fatheads. Brett is going to chat with a few folks to determine if this would be feasible or not. Not sure if it would be ideal to find a different species that would utilize the soil more should it get wet during precip events- tadpoles- or a different assay altogether.

Using extracts of the entire soil I believe disregard the bioavailability aspect, but maybe something could be said about bioaccessibility?

How does the predicted effects compare to measured effects?

Unknowns/Questions:

Best flow for research: Identify pesticides and transformation products and then run toxicity tests? Since we have a good idea of the contaminants of concern, not sure the effects-directed analysis is a good starting point unless some of the transformation products are unknown and biologically active, but it would help us isolate which contaminants are responsible for most of the toxicity.

Types of soil samples needed: It would be great to have a time series of samples taken from the same location- before the application of wetcake and a few after, or even a few from the same location taken after application. It would be a good starting point to determine if there is a loss of parent pesticides and increase in transformation products.

Find out more information about Attagene- type of testing and what it tells you.

I think looking at samples along a vertical (soil cores) or horizontal (surficial soils away from source to water body) transect might provide information on movement of contaminants, but might not be clear-cut for transformation of parent pesticides.